

AIR/OIL BOOSTER



The pressure multiplier uses a combination of air and oil to generate considerable pressures.

The principle is based on the difference of the surface of the two pistons, which are connected by a single piston rod, so the pressure increases in proportion to the ratio of the two areas. The circuit is connected to the oil container allowing automatic compensation for minor leakage at each stroke. The pressure multipliers can be mounted in any position, but the recovery tank must be positioned vertically, higher than the multiplier. The use of FRL units of a suitable capacity in nl/min is required for efficient air treatment. It is advisable to mount a non-return valve before the pneumatic valve for use when the compressed air supply fails.



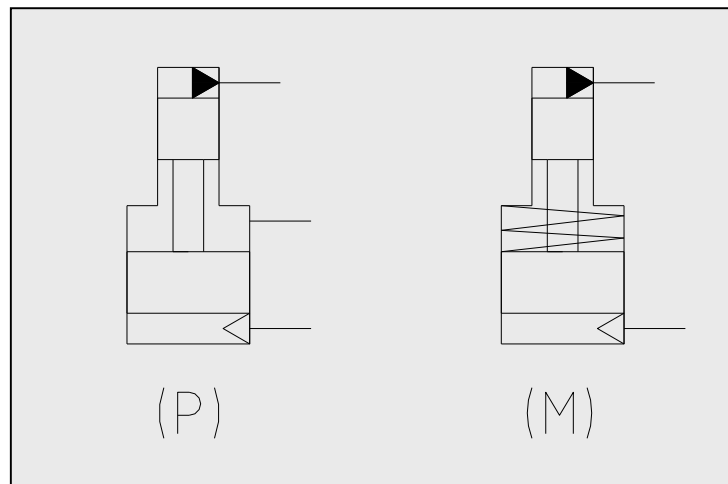
APPLICATIONS

For operating single-acting and dual-acting hydraulic cylinders.

Clamping tools, vices, dies and moulds, device for bending, cutting, punching, drawing, calking and marking, and riveting modules.

(P) = COMPRESSED-AIR RETURN

(M) = SPRING-LOADED RETURN



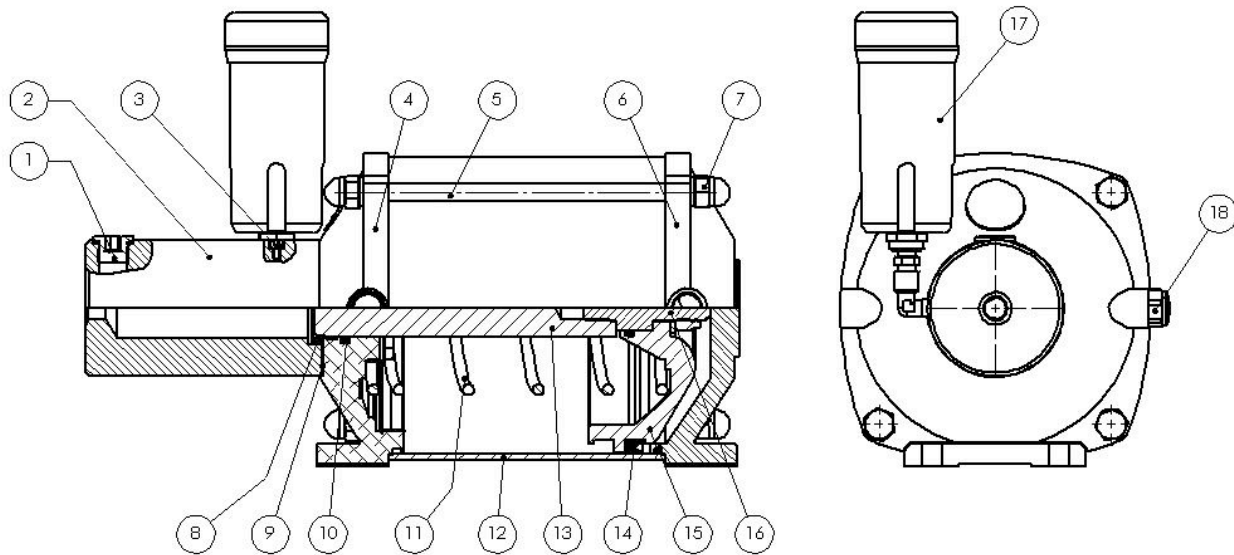
TECHNICAL DATA

		SERIES 01	SERIES 02	SERIES 03
Bore	mm	100	100	160
Volume of oil supplied	cm ³	11-57	31-196	19-149
Compression ratio		20:1-39:1	4:1-12,5:1	20:1-52:1
Maximum pneumatic input pressure	bar	8	8	10
Maximum hydraulic output pressure	bar	312	100	500
Working temperature range	°C	-10° to +70		
Recommended oil		DEXRON ATF		
Fluid		Filtered lubricated or unlubricated air If lubricated air is used, lubrication must be continuous		

KEY TO CODES

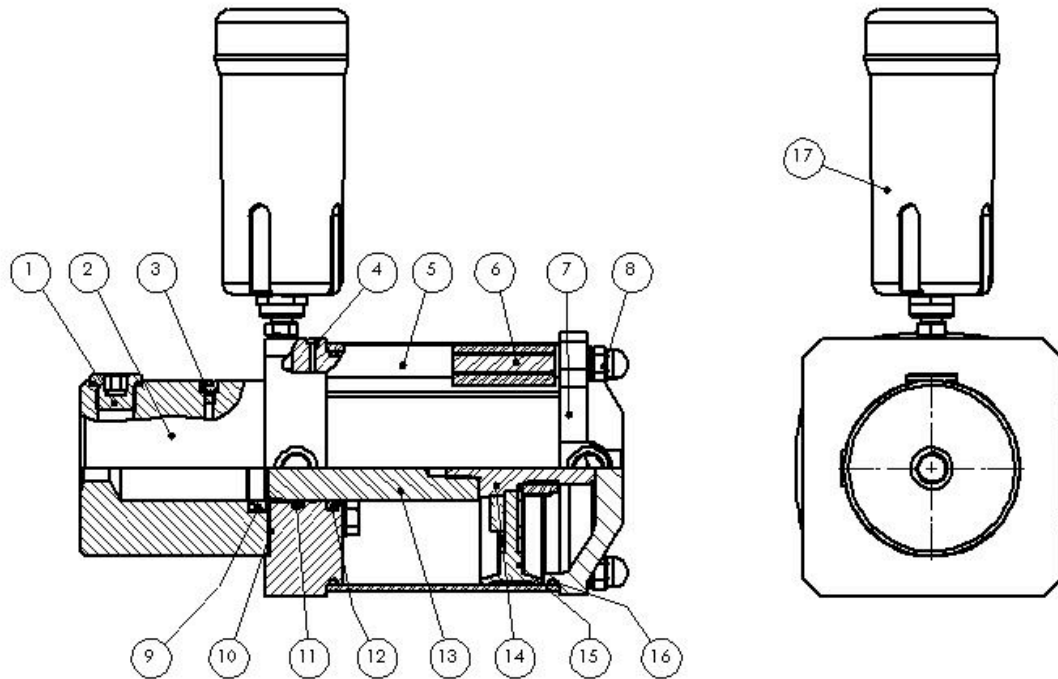
Z52	02	100	28	05	P
	SERIES	BORE	PISTON ROD DIAMETER	STROKE (CM)	RETURN
	01	100	16 18 20 22	05 08 10 15	P Pneumatic M Spring-loaded (stroke 05 only)
	02	100	28 32 35	05 10 15	P
	03	160	22 25 32 35	05 07 10 15	P M

COMPONENTS OF MULTIPLIERS 01 AND 03



- | | | |
|---|---|--|
| 1 TAPPO TRF : acciaio zincato | 7 DADO CIECO : acciaio zincato | 13 STELO : acciaio cromato temprato |
| 2 CAMERA OIO : acciaio verniciato | 8 GUARNIZIONE STELO : poliuretano | 14 GUARNIZIONE PISTONE : gomma (versione Ø160) |
| 3 VITE DI SPURGO : acciaio zincato | 9 GUARNIZIONE : klingspil C-4430 | 15 PISTONE : Alluminio da fusione
Gomma (versione Ø100) |
| 4 TESTATA ANTERIORE : alluminio da fusione | 10 GUARNIZIONE O R : gomma NBR | 16 PROLUNGA STELO : acciaio zincato |
| 5 BRANII : acciaio zincato | 11 MOLLA : acciaio C85 (x moltiplicatori versione "M") | 17 SERBATOIO OIO |
| 6 TESTATA POSTERIORE : alluminio da fusione | 12 CAMICIA : tubo alluminio anodizzato Ø160
alluminio profilato ed anodizzato Ø100 | 18 SILENZIATORE : ottone nichelato |

COMPONENTS OF MULTIPLIER 02 e riferimenti



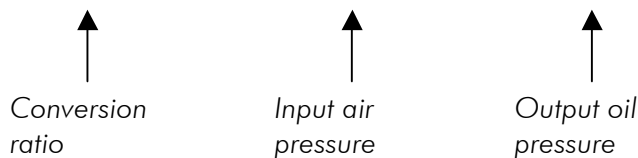
- | | | |
|--|---|-------------------------------------|
| 1 TAPPO TRF : acciaio zincato | 6 TIRANTI : acciaio zincato | 12 GUARNIZIONE STELO : gomma NBR |
| 2 CAMERA OLIO : acciaio verniciato | 7 TESTATA POSTERIORE : alluminio da fusione | 13 STELO : acciaio cromato temprato |
| 3 VITE DI SPURGO : acciaio zincato | 8 DADO CIECO : acciaio zincato | 14 PROLUNGA STELO : acciaio zincato |
| 4 FILTRO SINTERIZZATO : bronzo | 9 GUARNIZIONE STELO : poliuretano | 15 PISTONE : gomma |
| 5 CAMICIA : alluminio profilato ed anodizzato Ø100 | 10 GUARNIZIONE : klingersil C-4430 | 16 GUARNIZIONE OR : gomma NBR |
| | 11 GUARNIZIONE OR : gomma NBR | 17 SERBATOIO OLIO |

SAMPLE APPLICATIONS

As explained above, the operating principle of pressure multipliers is based on the different surface of the two pistons, so the pressure increases directly in proportion to the area conversion ratio. An example of this concept is explained below.

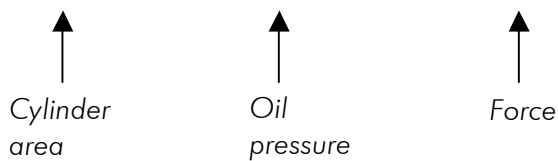
Let us suppose the first piston has a surface area of 200 cm² and pushes a second piston with a surface area of 8 cm². The pressure reached by the oil is as follows:

$$200 \text{ cm}^2 / 8 \text{ cm}^2 = 25 \times 6 \text{ bar (air)} = 150 \text{ bar (oil)}$$

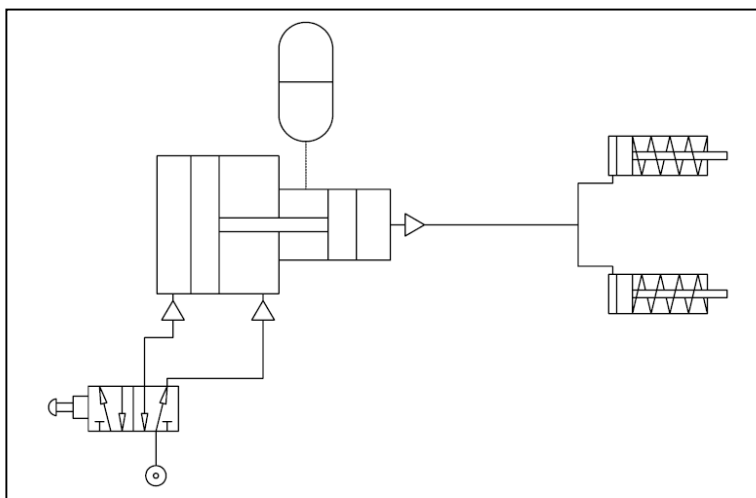


Therefore a hydraulic cylinder with an inside diameter of 40mm will generate the following force:

$$12.56 \text{ cm}^2 \times 150 \text{ bar} = 1884 \text{ Kg (1884 DaN)}$$



EXAMPLE 1 – Control diagram for single-acting hydraulic cylinders

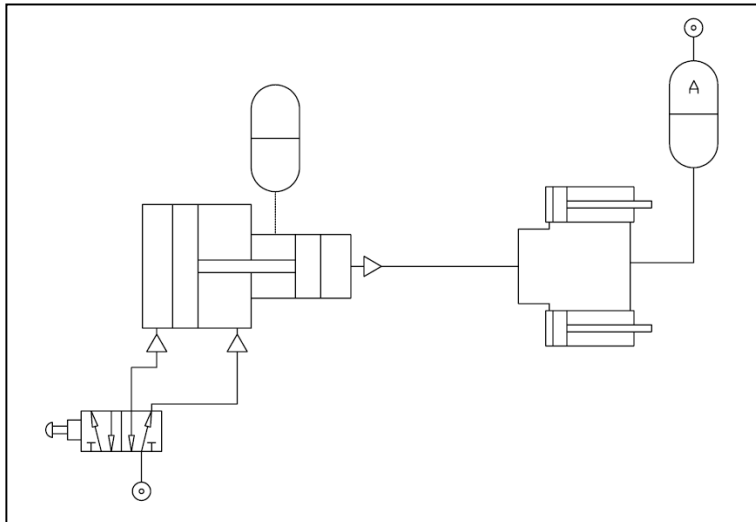


When a 5/2 valve sends a signal, air enters the multiplier and pushes the first piston. The second piston, which is connected to the first, plunges into an oil chamber, generating a pressure that is converted into a thrust force operating the two connected cylinders.

When the opposite signal is sent, the oil re-enters the chamber, aided by the springs in the cylinder.

Oil in the tank is used to make up for any leaks.

EXAMPLE 2 – Control diagram for dual-acting hydraulic cylinders



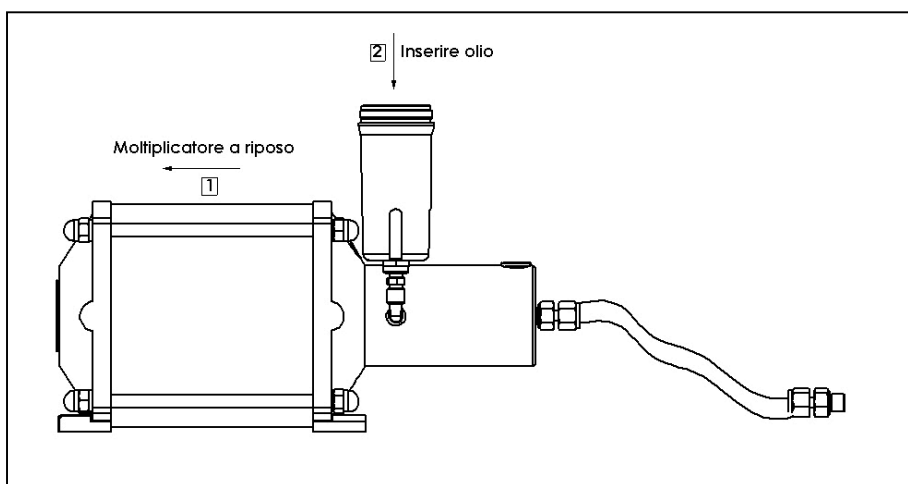
When a 5/2 valve sends a signal, air enters the multiplier and pushes the first piston. The second piston, which is connected to the first, plunges into an oil chamber, generating a pressure that is converted into a thrust force operating the two connected cylinders. The cylinder return is regulated in this case by the pressure of the air in the compensator A. Another multiplier can be installed instead of the compensator.

OIL FILLING METHODS

When designing the hydraulic circuit, it is necessary to take an important operation into consideration. The oil tank must be positioned at the highest point of the circuit so that excess air can be released and the pressure maintained without any residual air.

1. Multiplier not pressurised
2. Fill with oil

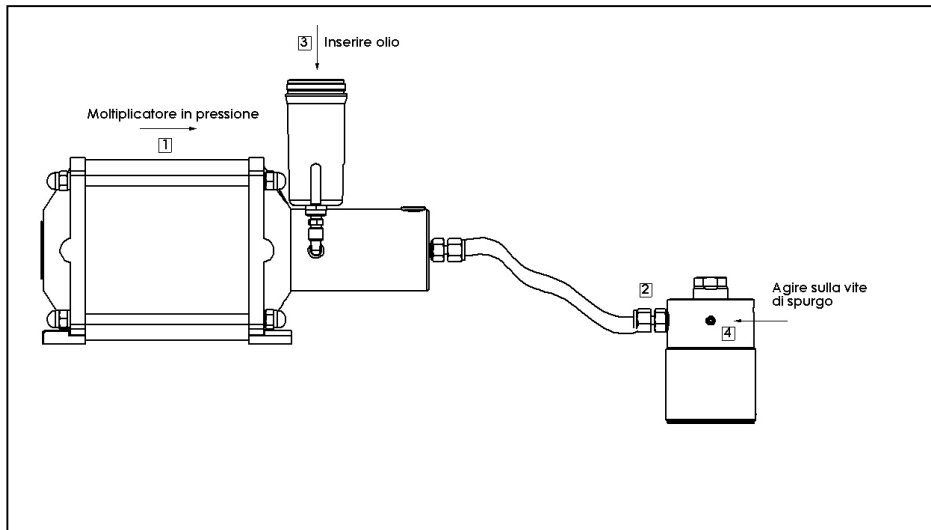
METHOD 1 – Multiplier not pressurised



Connect the high-pressure pipe to the multiplier outlet.
Do not pressurize the surface, leaving the piston in the home position (1)
Fill the recovery tank (2) with oil until it starts to come out of the pipe.
The circuit is now full of oil, so connect the cylinder to the end of the pipe.

Agganciare il tubo alta pressione all'uscita del moltiplicatore.
Non immettere aria nel circuito lasciando il pistone a riposo(1).
Inserire olio nel serbatoio di recupero fino a farlo fuoriuscire dal tubo (2).
A questo punto tutto il circuito è pieno di olio quindi agganciare il cilindro all'estremità del tubo.

METHOD 2 – Multiplier pressurised



Connect one end of the high-pressure pipe to the multiplier outlet.

Pressurise the multiplier, **WITHOUT FILLING WITH OIL** (1).

Connect the other end of the pipe to the cylinder (2) and fill the tank (3) with oil.

Depressurise the multiplier – you can see the oil in the tank returning to the steel chamber.

Unscrew the cylinder lead screw (4) slightly and feed **LOW** pressure air into the multiplier.

Oil will start to come out of the hole in the cylinder after a few cycles. Close the valve.

N.B. Do not unscrew the bleed screw completely as you would lose control of the oil.